Reducing Older Driver Injuries at Intersections Using More Accommodating Roundabout Design Practices

Dominique Lord
Ida van Schalkwyk
Loren Staplin
Sue Chrysler

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Center for Transportation Safety

PROBLEM STATEMENT

- 45% of all crashes occur at intersections
- Crashes involving older drivers over-represented at intersections
- Difficulty with left-turning maneuver (self-reported/crash data) (most severe crashes)

Factors:

- Slower decision-making process
- Narrowing of visual field
- Slower eye movement
- Depth perception
- Limited physical abilities

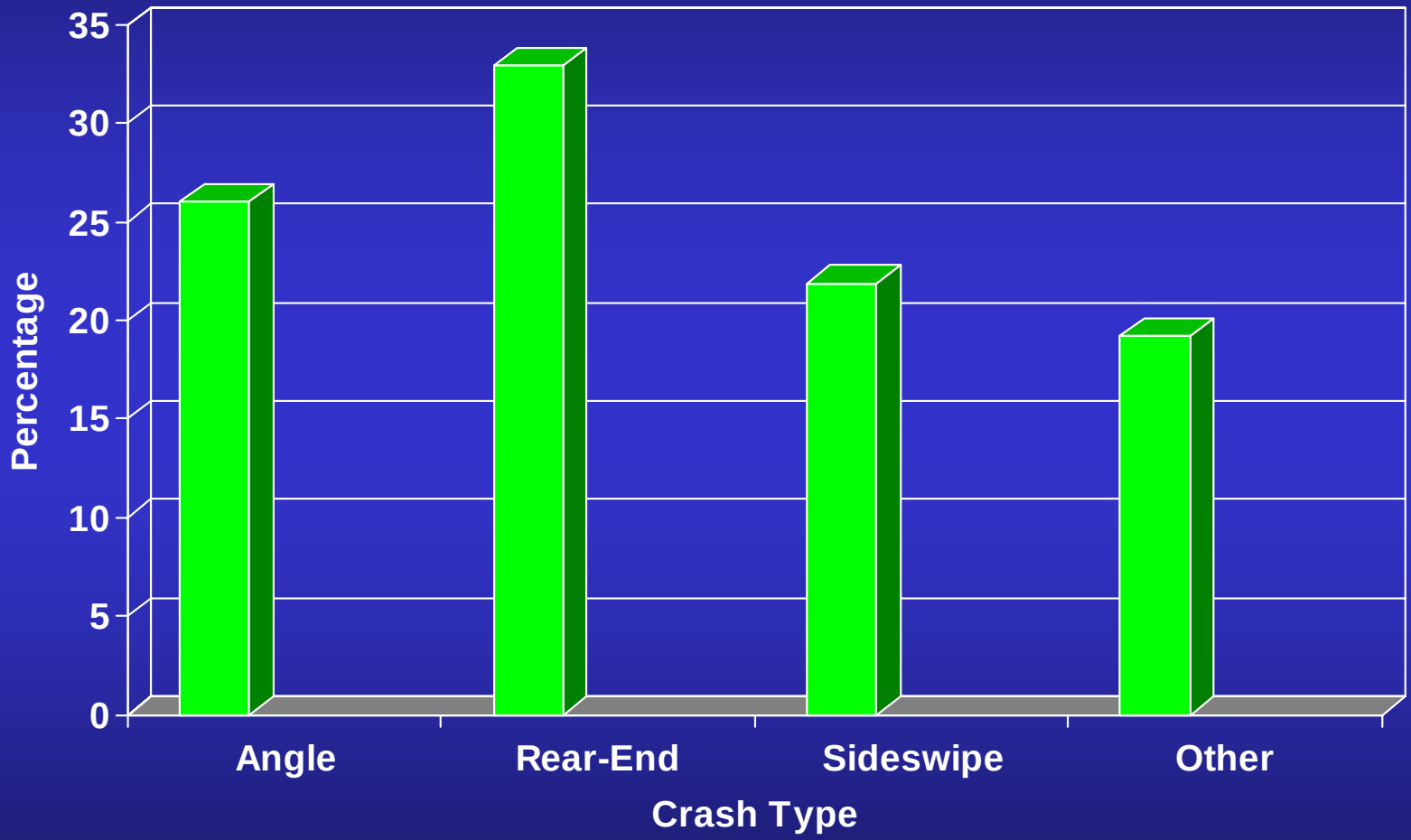
STUDY OBJECTIVES

a) Identify elements of roundabout design and operations that may be problematic for older drivers

b) Develop recommendations and guidelines for countermeasures with the potential to improve the comfort, confidence, and safety of seniors in using roundabouts.

- Literature Review
- Crash Data Analysis
- Phase I – Focus Group Study
- Phase II – Structured Interviews
- Analysis of Results

Crash Data Analysis



Phase I – Focus Group Study

Measures of Effectiveness:

- Obtain feedback

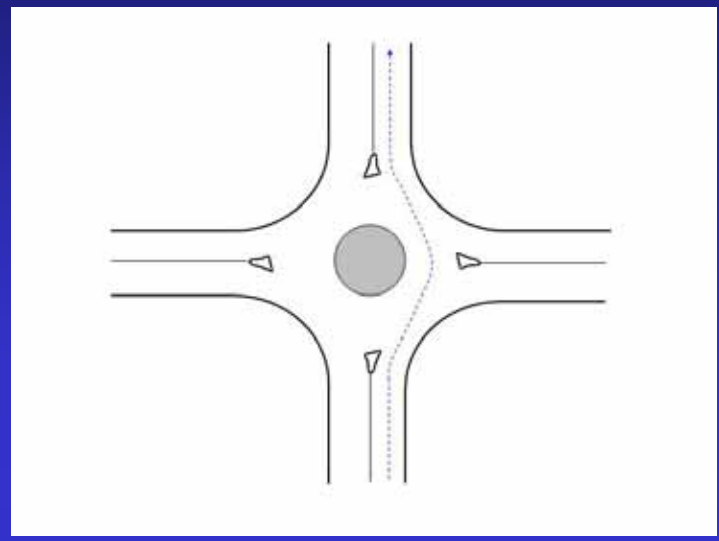
Methodology:

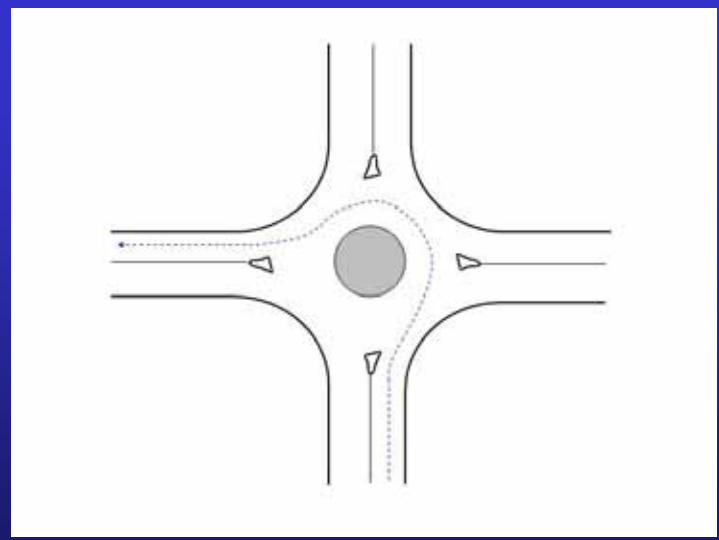
- 4 groups of 10 subjects (65+)
- Static and dynamic presentations
- Discussion of issues (no leading questions if possible)

Phase I – Focus Group Study

Design Elements:

- Single-Lane Roundabout
- Double-Lane Roundabout
- Center Islands
- Splitter Islands & Gore
- Warning & Approach Signs
- Entrance Signs & Pavement Markings
- Street Name Exit Signs





Phase I – Focus Group Study

Run1

Phase I – Results

- Double-lane roundabouts too complex for about ¼ of subjects
- Need to be warned about an upcoming roundabout
- Lane assignment information very important
- If familiar with environment, roundabouts usually not a problem
- Protected left-turn at signalized intersections still preferred choice for turning left

Phase II – Structured Interviews

Measures of Effectiveness:

- Level of comfort
- Level of confidence
- Level of safety (perceived)

Methodology:

- 30 individual subjects (65+)
- Static and dynamic presentations
- Bipolar (Likert) rating scales (7-point & 6-point)

Phase II – Structured Interviews

Design Element	Base	Count#1	Count#2
A – Warning Sign	ABase	A1	A2
B – Guide Sign	BBase	B1	B2
C – Directional Sign	CBase	C1	C2
D – Yield Treatment	DBase	D1	D2
E – Exit Treatment	EBase	E1	E2

Phase II – Structured Interviews

Base Condition

Phase II – Structured Interviews

Phase II – Structured Interviews

Phase II – Structured Interviews

Run2

Phase II – Results

Design Element A: Both Alternatives Had Similar Ratings

Phase II – Results

Design Element B: Participants Preferred Guide Signs with Text

Phase II – Results

Design Element C: Location of One-way Sign had no Effect on the Measures of Effectiveness

Phase II – Results

Design Element D: Yield Pavement Marking not well Understood

Phase II – Results

Design Element E: Participants Preferred Sign with Arrow

Recommendations

- Advanced Warning Signs with “Roundabout”
- Guide Signs with Text
- One-Way Signs (facing the gore area)
- Yield Signs with “To Traffic in Circle” (no “shark’s teeth”)
- Exit Signs with Arrow (located on the island)

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